REMARKS

Administrative Overview

The Office action dated February 26, 2007, examined claims 47-82. The Office action rejected claims 47-61 and 63-82 under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. Patent No. 6,537,211 (**Wang**). The Office action also rejected claim 62 under 35 U.S.C. 103(a) as allegedly being unpatentable over **Wang**.

Applicants respectfully traverse these rejections.

Claim 69 is amended to insert the word "incident" for purposes of clarity. No new matter is added.

Applicants add new dependent claims 83-86. These claims are supported in the original specification, for example, at page 2, lines 13-18, reproduced as follows [emphasis added]:

> analysis. By illuminating a region of tissue with light incident to the region at more than one angle, it is possible to obtain redundant spectral data for the region. If one set of data for a region is adversely affected by an artifact such as glare, shadow, or an obstruction, then redundant data for the region, obtained using light incident to the region at a different angle, may be useful. The redundant data may be used to describe the region of tissue, unobscured by the artifact.

No new matter is added thereby. Following entry of this paper, claims 47-86 will be pending.

Independent claims 47, 56, 68, and 69 are patentable over **Wang**

Each of independent claims 47, 56, 68, and 69 recites, in part, "illuminating optics for illuminating a region of a tissue sample with electromagnetic radiation incident at a first angle and subsequently illuminating the region of the tissue sample with electromagnetic radiation incident at a second angle". The cited art does not teach or suggest this element.

The Office action cites Figure 12 of **Wang** as allegedly teaching this element. Figure 12 of **Wang** is reproduced below:

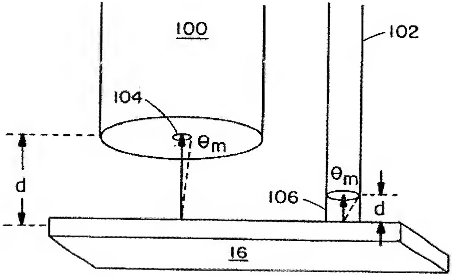

FIG. 12

Figure 12 of **Wang** is a diagram showing collection geometry for an endoscope (**100**) and a single point probe (**102**) used in the endoscopic imaging system described in **Wang**. The parameter θ_m in Figure 12 does *not* denote an *incident* angle of electromagnetic radiation, but rather corresponds to *collection* angle. **Wang** teaches illuminating tissue with light from an endoscope or point probe positioned *normal* to the tissue surface. Both the endoscope (**100**) and the single point probe (**102**) in Figure 12 are positioned normal to the tissue surface. **Wang** does *not* teach or suggest optics for illuminating a region of a tissue sample with light incident at a first angle, and for subsequently illuminating the region with light incident at a second angle, along with the associated processor, as recited in each of the independent claims of the present invention.

The parameter θ_m in Figure 12 corresponds to a collection angle, not an incident angle. This is explained at column 17, lines 43-53, of **Wang** [emphasis added]:

geometries of the imaging system and single point. In FIG. **12**, a diagram of the collection geometry for the endoscope **100** and the single point probe **102** is shown. The endoscope contains a 2.5 mm diameter objective lens **104**, and is located in air at a distance 20 from the surface of the tissue. This geometry corresponds to a collection angle of 40°. The probe contains a quartz shield **106** which is in contact with the tissue **16**. The optical fibers are located at a distance of 2 mm from the tissue surface by this shield **106**, and collect light at a NA=0.22, which corresponds to a collection angle of 12.7°. The optical parameters of colonic mucosa for the excitation and emission wavelengths are shown in Table 2.

Wang describes the problem of a shadow artifact. However, **Wang** teaches a solution to this problem that is different from and that teaches away from the invention claimed in the present application.

For example, **Wang** does not suggest subsequent illumination at different incident angles. In contrast, **Wang** teaches use of an endoscope positioned at one angle – *normal* – to the tissue surface. This is explained at column 14, lines 10-14, and at column 19, lines 37-40, of **Wang**, reproduced below (emphasis added):

col. 14, lines 10-14

> Overlay regions indicating disease included one located at the site of the adenoma, and the other two corresponded to shadows cast by mucosal folds. The shadows appeared as regions of reduced intensity on the fluorescence image. These effects were minimized by directing the endoscope normal to the mucosal surface. Moreover, the overlay

col. 19, lines 37-40

> was 1.1±0.2. The diseased regions on fluorescence best corresponded to the adenoma on white light when the colonoscope was at normal incidence. At higher angles there were greater effects from shadows. These results showed

At column 20, lines 11-15, **Wang** suggests "future directions to improve the sensitivity and clinical usefulness of fluorescence endoscopic imaging", as reproduced below (emphasis added)

> Finally, the results of the clinical studies identified future directions to improve the sensitivity and clinical usefulness of fluorescence endoscopic imaging. The shadow artifact can be reduced by illuminating the tissue through the two white light ports. This modification can be accomplished by replacing the glass fibers with quartz, thus allowing for both white and excitation light to be transmitted. Furthermore, the

The use of "two white light ports" is further described at column 21, lines 42-58 of **Wang**, reproduced below (emphasis added):

> The shadow artifact obtained using the broadband intensity algorithm with 365 nm excitation can be greatly reduced by use of an improved excitation geometry. Currently, excitation light is delivered through a single quartz fiber located in the biopsy channel located 8.3 mm from the CCD detector. The use of a single illumination beam located a large distance from the CCD chip tends to enhance shadows. In contrast, in the conventional white light images produced by this colonoscope, shadows are minimized by use of two closely spaced white light illumination beams symmetrically positioned on opposite sides of the CCD chip. By replacing the illumination fibers with quartz fibers, the UV light can be delivered through the two white light illumination ports, which are located only 3.8 mm from the CCD detector. Implementing this requires modifying the video processor to enable alternate coupling of white light and laser excitation into the illumination fibers.

Thus, **Wang** suggests a future embodiment featuring illumination with white light emanating from two ports *simultaneously*, and an embodiment in which the white light may be alternated with laser excitation through the same two ports (where laser light emanates from both ports *simultaneously*).

This does *not* suggest illumination of a region of tissue with light incident at a first angle and *subsequent* illumination with light incident at a second angle.

Each of the claims depending from independent claims 47, 56, 68, and 69 includes all of the limitations of its corresponding independent claim. Accordingly, Applicants request that the rejections of claims 47-82 be reconsidered and withdrawn, and that the claims be allowed in due course.

CONCLUSION

In view of the foregoing, Applicants respectfully request withdrawal of all rejections, and allowance of claims 47-86 in due course. The Examiner is hereby cordially invited to contact Applicants' undersigned representative by telephone at the number listed below to discuss any outstanding issues.

Respectfully submitted,

Date: May 29, 2007
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